

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 December 2003 (24.12.2003)

PCT

(10) International Publication Number
WO 2003/106595 A3

(51) International Patent Classification⁷: C10L 1/14, 10/00

(21) International Application Number:
PCT/US2003/018724

(22) International Filing Date: 13 June 2003 (13.06.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/388,693 14 June 2002 (14.06.2002) US

(71) Applicant (for all designated States except US): **THE LUBRIZOL CORPORATION** [US/US]; 29400 Lakeland Boulevard, Wickliffe, OH 44092-2298 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FORESTER, David, R.** [US/US]; 10209 Stonehedge Drive, Concord Township, OH 44077 (US). **ROBERTS, David, C.** [US/US]; 38501 Eagle Nest Lane, Willoughby Hills, OH 44094 (US). **MANKA, John, S.** [US/US]; 10440 Penniman Drive, Chardon, OH 44024 (US). **MALIK, Bharat, B.** [IN/US]; 640 Birch Drive, Euclid, OH 44132-2106 (US).

(74) Agents: **MUNSON, Jeffrey, F.** et al.; The Lubrizol Corporation, 29400 Lakeland Boulevard, Wickliffe, OH 44092-2298 (US).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
26 February 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: JET FUEL ADDITIVE CONCENTRATE COMPOSITION AND FUEL COMPOSITION AND METHODS THEREOF

(57) Abstract: A jet fuel additive concentrate composition comprises a solvent and a combination of components. A fuel composition and methods to improve thermal stability of a jet fuel and to reduce deposits in a jet engine include the jet fuel additive concentrate composition. The improvement in the thermal stability of a jet fuel is synergistic when the combination of components includes a cold-flow improving composition.

BEST AVAILABLE COPY

WO 2003/106595 A3

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C10L1/14 C10L10/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C10L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/25793 A (BP OIL INT ; TAYLOR SPENCER EDWIN (GB)) 27 May 1999 (1999-05-27) cited in the application page 8, line 1 - page 10, line 10	1,3,4, 9-14
X	WO 01/079397 A (INFINEUM INTERNAT LTD ; FAVA CARLO (GB); JACKSON GRAHAM (GB)) 25 October 2001 (2001-10-25) page 12, line 20 - page 13, line 2; claims 1-4,8-13 page 20, line 1 - line 11 page 28, line 24 - page 29, line 10	1,3,4, 9-11,15, 17,21,22
X	US 5 821 202 A (MALIK BHARAT B ET AL) 13 October 1998 (1998-10-13) cited in the application column 11, line 20 - column 12, line 60; claims 13,23,27	1,2,8, 10,12,13
	----- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

12 December 2003

Date of mailing of the international search report

19/12/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

de La Morinerie, B

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/25677 A (LUBRIZOL ADIBIS HOLDINGS LTD ; MORETON DAVID JOHN (GB)) 27 May 1999 (1999-05-27) cited in the application page 18; claim 14; example 1 page 24, paragraph 27 -----	1,3,4,7, 9,10
X	WO 87/01126 A (LUBRIZOL CORP) 26 February 1987 (1987-02-26) page 17, line 20 - line 25 -----	1,4
A	US 6 017 370 A (ZIEGLER KIM L ET AL) 25 January 2000 (2000-01-25) cited in the application the whole document -----	15,17-21
A	WO 99/61562 A (INFINEUM UK LTD ; INFINEUM USA LP (US)) 2 December 1999 (1999-12-02) page 33, line 8 - line 16; claims 1-8,11,12,16-18 page 34, line 1 - line 12 -----	1,2, 9-11,15, 17,21,22
A	US 4 234 435 A (DAVIS KIRK E ET AL) 18 November 1980 (1980-11-18) cited in the application column 19, line 53 - line 63; example 40 -----	4,5
A	EP 0 678 568 A (BETZ EUROP INC) 25 October 1995 (1995-10-25) cited in the application the whole document -----	6
A	EP 0 476 196 A (ETHYL PETROLEUM ADDITIVES LTD) 25 March 1992 (1992-03-25) page 4, line 8 - line 35 page 9, line 31 page 11, line 16 - line 17 -----	1-25
A	WO 01/062874 A (LUBRIZOL CORP) 30 August 2001 (2001-08-30) cited in the application the whole document -----	15,17-20

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9925793	A	27-05-1999	AT 206744 T	15-10-2001
			AU 733400 B2	10-05-2001
			AU 1164199 A	07-06-1999
			BG 104518 A	30-03-2001
			BR 9814151 A	27-11-2001
			CA 2309061 A1	27-05-1999
			CN 1278856 T	03-01-2001
			DE 69802003 D1	15-11-2001
			EP 1029026 A1	23-08-2000
			GB 2346154 A ,B	02-08-2000
			WO 9925793 A1	27-05-1999
			HU 0004736 A2	28-04-2001
			JP 2002506085 T	26-02-2002
			NO 20002471 A	05-07-2000
			PL 340304 A1	29-01-2001
			SK 6772000 A3	03-12-2001
			TR 200001227 T2	22-01-2001
			US 6270537 B1	07-08-2001
			US 2001003231 A1	14-06-2001
			ZA 9809742 A	26-04-2000
WO 0179397	A	25-10-2001	AU 5832901 A	30-10-2001
			CA 2403793 A1	25-10-2001
			WO 0179397 A2	25-10-2001
			EP 1274820 A2	15-01-2003
US 5821202	A	13-10-1998	AU 6362298 A	05-11-1998
			CA 2235835 A1	29-10-1998
			DE 69815752 D1	31-07-2003
			EP 0877072 A2	11-11-1998
WO 9925677	A	27-05-1999	AU 1047299 A	07-06-1999
			DE 69811208 D1	13-03-2003
			DE 69811208 T2	27-11-2003
			EP 0954517 A1	10-11-1999
			WO 9925677 A1	27-05-1999
			JP 2001508084 T	19-06-2001
			US 6200936 B1	13-03-2001
WO 8701126	A	26-02-1987	US 4659338 A	21-04-1987
			US 4690687 A	01-09-1987
			AT 77828 T	15-07-1992
			AT 118528 T	15-03-1995
			AT 154068 T	15-06-1997
			AU 591394 B2	30-11-1989
			AU 6192986 A	10-03-1987
			AU 600058 B2	02-08-1990
			AU 8253087 A	31-03-1988
			BR 8606850 A	03-11-1987
			CA 1303853 C	23-06-1992
			CN 86106817 A ,B	27-05-1987
			DE 3650239 D1	23-03-1995
			DE 3650239 T2	08-06-1995
			DE 3650634 D1	10-07-1997
			DE 3650634 T2	15-01-1998
			DE 3685877 D1	06-08-1992
			DE 3685877 T3	29-07-1999
			DE 233250 T1	17-03-1988

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 8701126	A		DK 66695 A	12-06-1995
			DK 192587 A	16-04-1987
			EP 0233250 A1	26-08-1987
			EP 0423744 A1	24-04-1991
			EP 0579339 A1	19-01-1994
			ES 2001515 A6	01-06-1988
			FI 871661 A	15-04-1987
			FI 871707 A	16-04-1987
			HK 36993 A	23-04-1993
			IL 79599 A	31-01-1991
			IN 167837 A1	29-12-1990
			JP 7088514 B	27-09-1995
			JP 63500602 T	03-03-1988
			MX 164983 B	13-10-1992
			NO 871551 A , B	13-04-1987
			NO 952019 A	22-05-1995
			SG 15993 G	16-04-1993
			WO 8701126 A1	26-02-1987
			US 4804389 A	14-02-1989
			ZA 8606177 A	25-03-1987
US 6017370	A	25-01-2000	EP 0989176 A1	29-03-2000
WO 9961562	A	02-12-1999	AU 4143199 A	13-12-1999
			CA 2332868 A1	02-12-1999
			DE 69903545 D1	21-11-2002
			DE 69903545 T2	14-08-2003
			WO 9961562 A1	02-12-1999
			EP 1088045 A1	04-04-2001
			JP 2002516382 T	04-06-2002
			US 6232277 B1	15-05-2001
US 4234435	A	18-11-1980	NONE	
EP 0678568	A	25-10-1995	US 5621154 A	15-04-1997
			AT 194379 T	15-07-2000
			AU 686321 B2	05-02-1998
			AU 1635395 A	26-10-1995
			CA 2146958 A1	20-10-1995
			DE 69517735 D1	10-08-2000
			DE 69517735 T2	01-03-2001
			EP 0678568 A1	25-10-1995
			ES 2147594 T3	16-09-2000
			PT 678568 T	31-10-2000
			US 5596130 A	21-01-1997
			US 5725611 A	10-03-1998
			BR 9510186 A	14-10-1997
			FI 972828 A	01-07-1997
			JP 10512310 T	24-11-1998
			NO 972720 A	02-07-1997
			NZ 301909 A	25-11-1998
			PL 320942 A1	24-11-1997
			TR 960797 A1	21-10-1996
			WO 9620990 A1	11-07-1996
EP 0476196	A	25-03-1992	EP 0476196 A1	25-03-1992
			AU 635158 B2	11-03-1993
			AU 8465091 A	26-03-1992

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0476196	A		CA 2051452 A1	21-03-1992
			DE 69004692 D1	23-12-1993
			DE 69004692 T2	10-03-1994
			ES 2060058 T3	16-11-1994
			JP 4234489 A	24-08-1992
			US 5944858 A	31-08-1999
<hr/>				
WO 0162874	A	30-08-2001	US 6610110 B1	26-08-2003
			AU 6654901 A	03-09-2001
			CA 2399882 A1	30-08-2001
			EP 1257620 A2	20-11-2002
			JP 2003524060 T	12-08-2003
			WO 0162874 A2	30-08-2001
			US 2002184814 A1	12-12-2002
<hr/>				

BEST AVAILABLE COPY